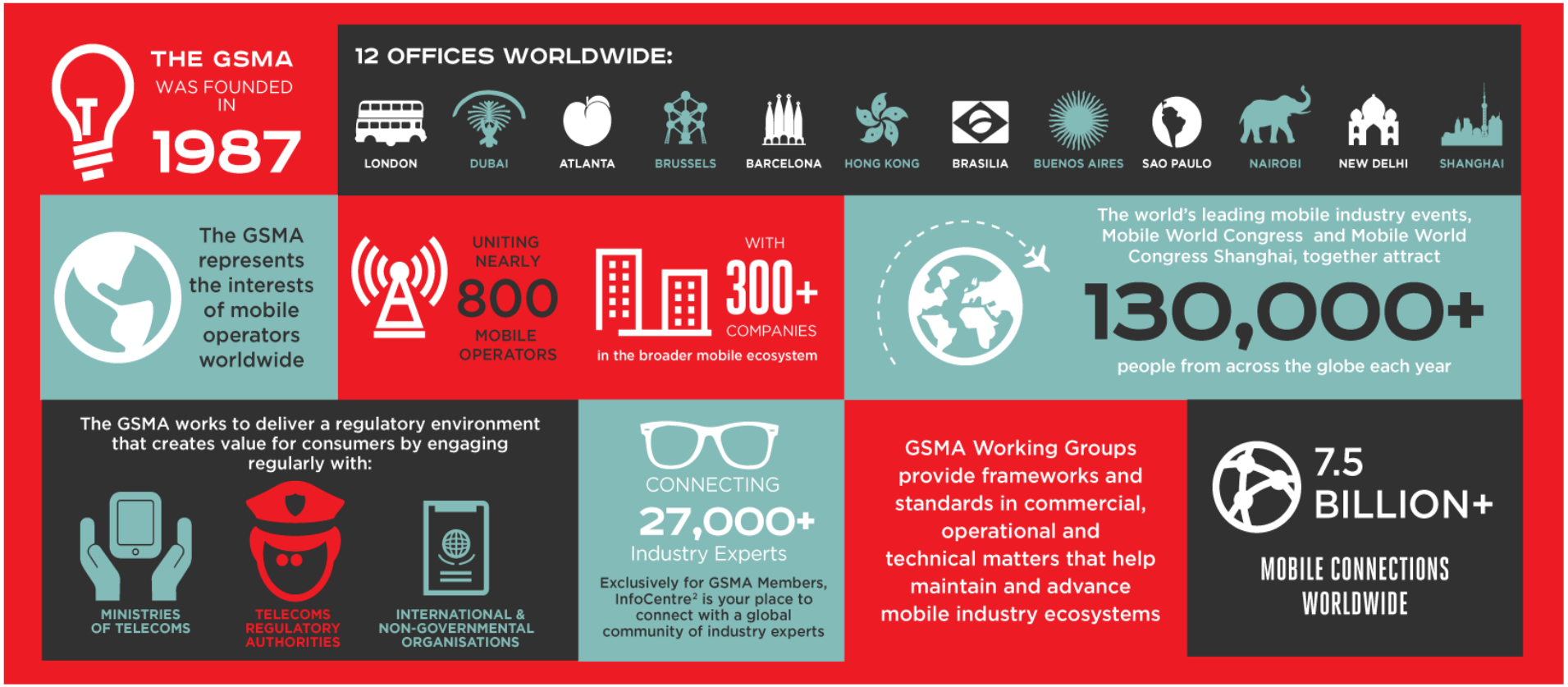
GSMA Internet of Things

Webinar:

Accelerating the Commercial Drones Market using Cellular Connectivity

Wednesday, 15 November 2017 | **3pm GMT**

About the GSMA



Drones Interest Group Members

GSMA Position on Drones

GSMA have created a policy position, on behalf of the mobile industry, to explain to policy makers and regulators the benefits of using mobile networks to provide ‘cellular connectivity’ to drones, which are:

- Support of unmanned traffic management solutions and no-fly zones
- Identification and registration schemes can be made possible for drones
- Tracking of drones can be enabled assisting law enforcement
- Mobile networks have a track record and useful tools to ensure privacy and data protection.

Mobile technology is a great enabler for the emerging drone market as:

- Infrastructure already exists & wireless services can be used for communications using commercially available licensed spectrum

The position is available at this link https://www.gsma.com/iot/iot-knowledgebase/gsma-regulatory-position-drones/

Supporting Unmanned Aircraft on Mobile Network

The GSMA created a paper that provides some insights on the current and future features of the mobile network for supporting unmanned aircraft, particularly for commercial application.

The paper is targeted at GSMA members to help them understand which aspects of the network are of particular interest for UA operations. The document provides information about:

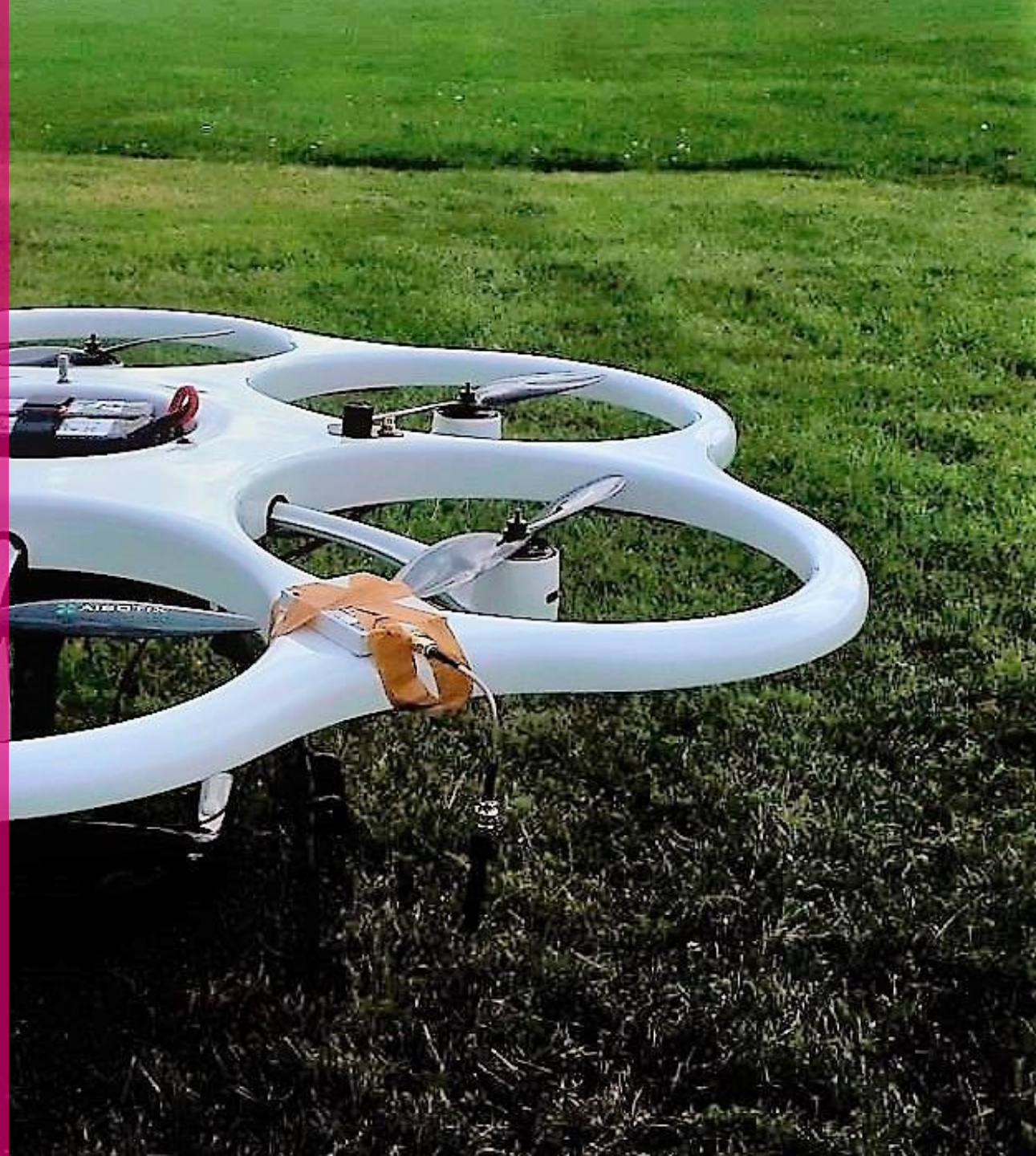
- Identification of unmanned aircraft in the mobile networks.
- Network performances and optimisation options.
- 3GPP work in support of UA operations, current and future.
- Analysis of potential type of communications for command and control and payload

Document available to GSMA members HERE

Next Steps for GSMA's Drones Project

- Report on how mobile networks add value to key use cases for drones, available by January 2018
  - It will also to explain results of the 3GPP study on drones
- Investigation of how mobile networks can support air traffic management
- Lobbying our policy position with regulators to encourage positive and globally aligned regulation on drones
- Several activities at Mobile World Congress 2018 on drones, including seminars, exhibitions and tours

drone connect



GSMA Webinar

By Ralph Schepp, DTAG
VP Project & Program Management

15.11.2017

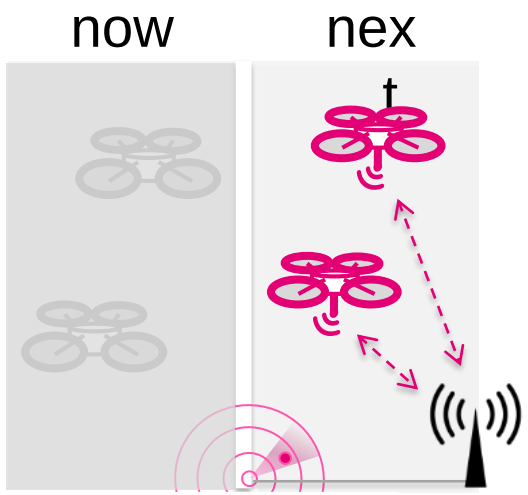
Why to connect drones via mobile network?

Mobile connectivity: Immediate advantage

- Standardized solution for worldwide connectivity
- Identification with SIM-credentials
- Licensed spectrum in cellular mobile network
- Secure communication channel

Cellular offers Three key elements to boost commercial drone market.

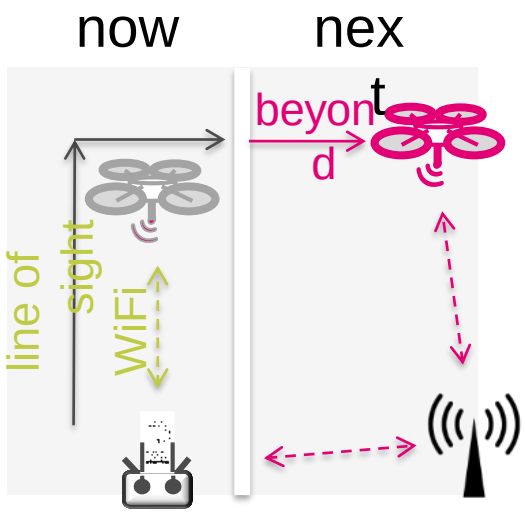
① Air Traffic Management (UTM)



Regulatory imperative:

Make drones visible on the radar

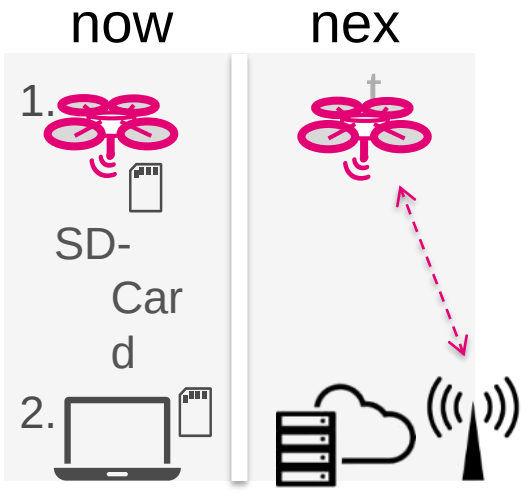
② BVLOS* Operations



Business need:

Make them fly *)beyond visual line of sight

③ Real-time Data Transfer



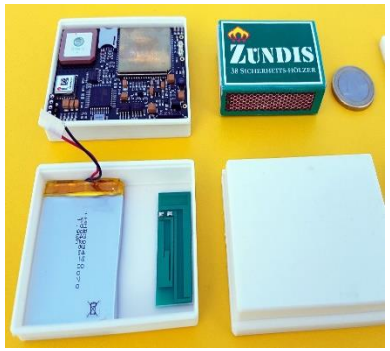
Business Need:

Real-time transfer & analytics of pictures, videos and sensor data

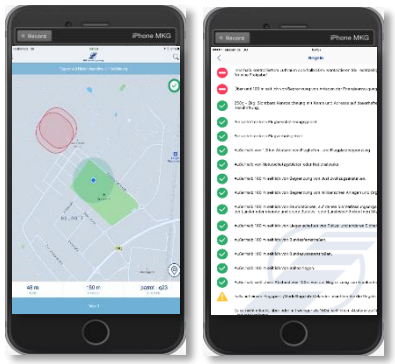
Make drones visible on the radar how cellular helps with Utm.

PREREQUISITES

HOD-prototype



UTM framework

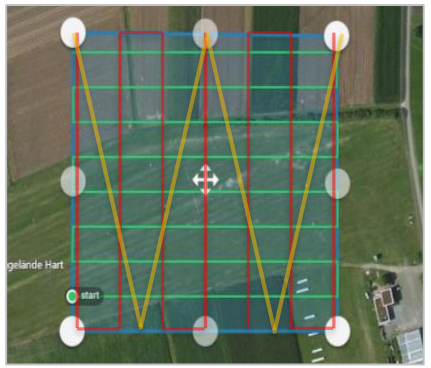


TRACKING TESTS

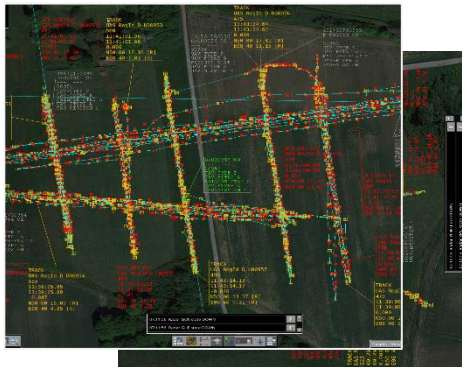
ONE DRONE -July-

SEVEN DRONES -August-

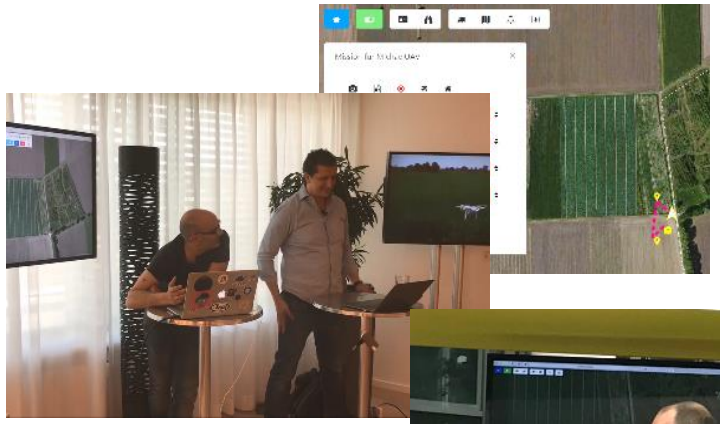
Flight-Mission

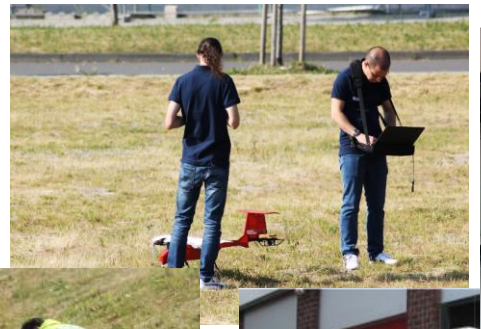


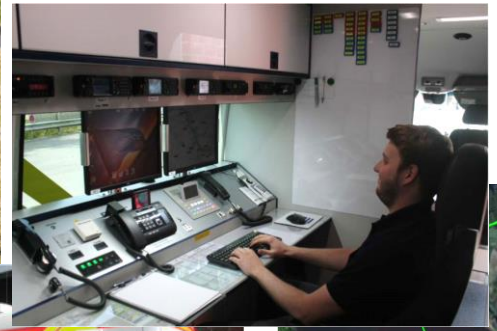
Tracking-Results

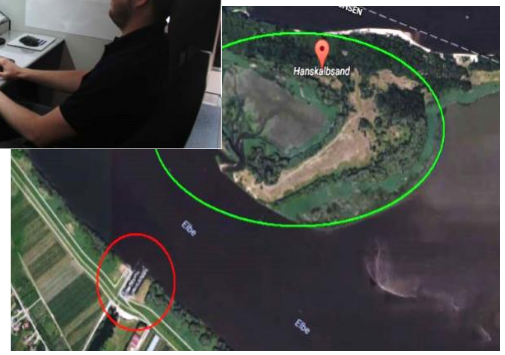


Make drones fly BVLOS and transfer real time data.









1st bvlos test-flight over cellular.

FIREFIGHTER REMOTE Drone operation.

DLRG BVLOS Mission with REAL-TIME DATA TRANSFER.

Exemplary DT show cases

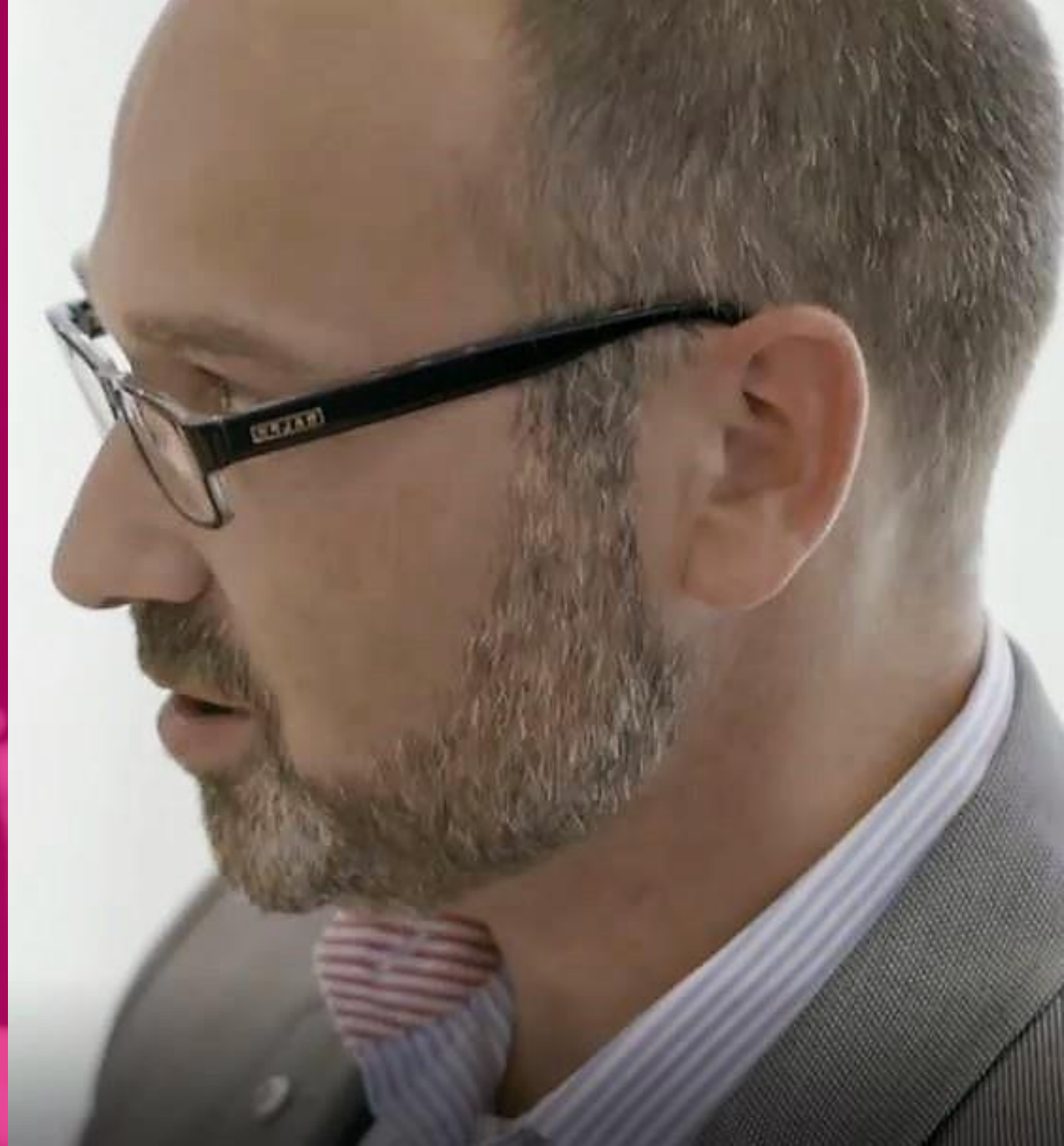
Key takeaways.

Cellular connectivity *(a Drone SIM)* is:

- globally available functions required by Aviation authorities (AAA)
- core enabler of UAV Traffic Management (UTM)
- key for efficient commercial drone operations (BVLOS).

Thank you!

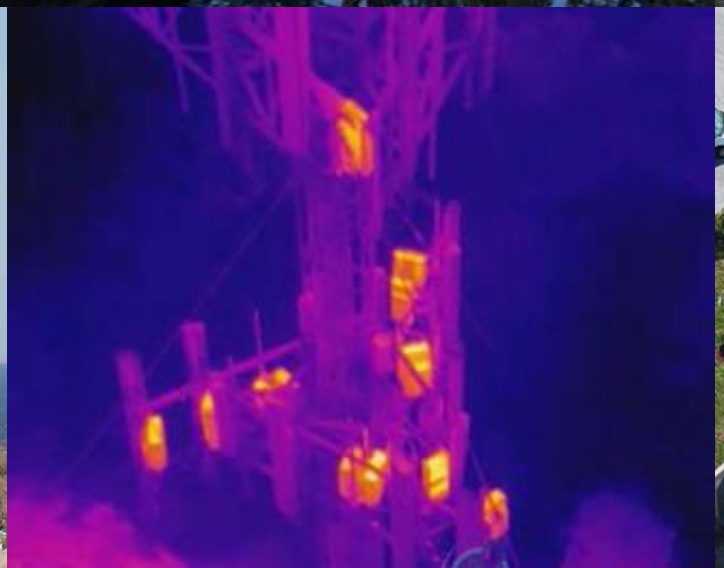
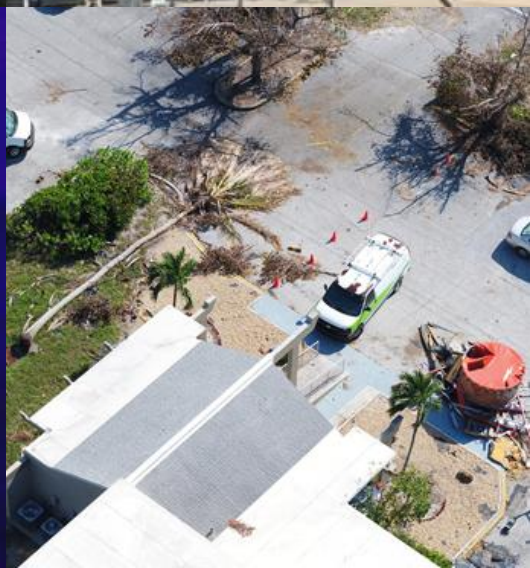
Ralph Schepp
VP Project & Program Management
Deutsche Telekom AG



UAS as a Tool Across Verizon

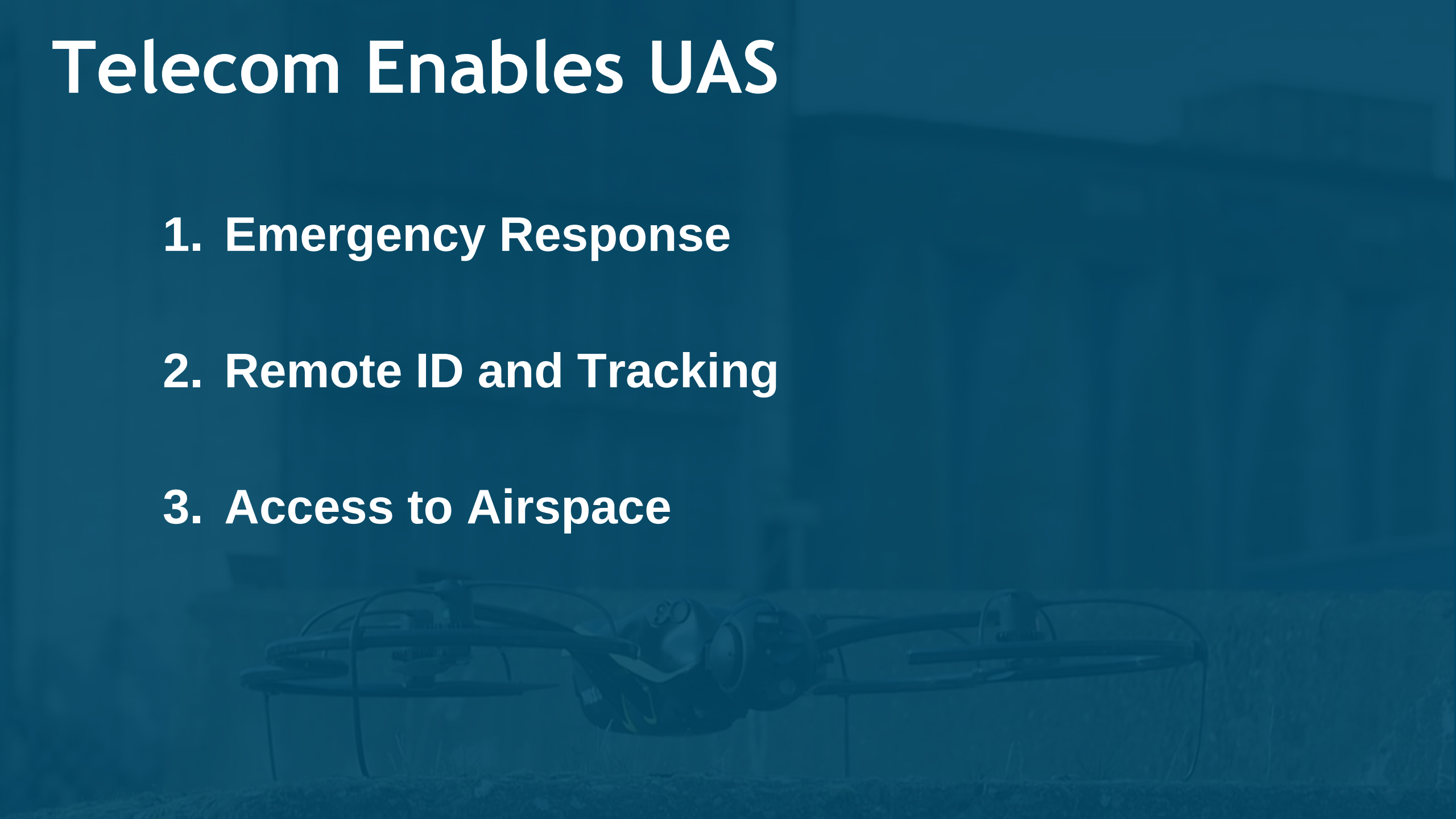




Telecom Enables UAS

1. Emergency Response
2. Remote ID and Tracking
3. Access to Airspace



Emergency Response

Hurricane Irma — Damage Evaluation

- Marco Island, Florida
- Pembroke Pines Emergency Operations Center
- Tower On Wheels (TOW)

Hurricane Harvey — Damage Evaluation

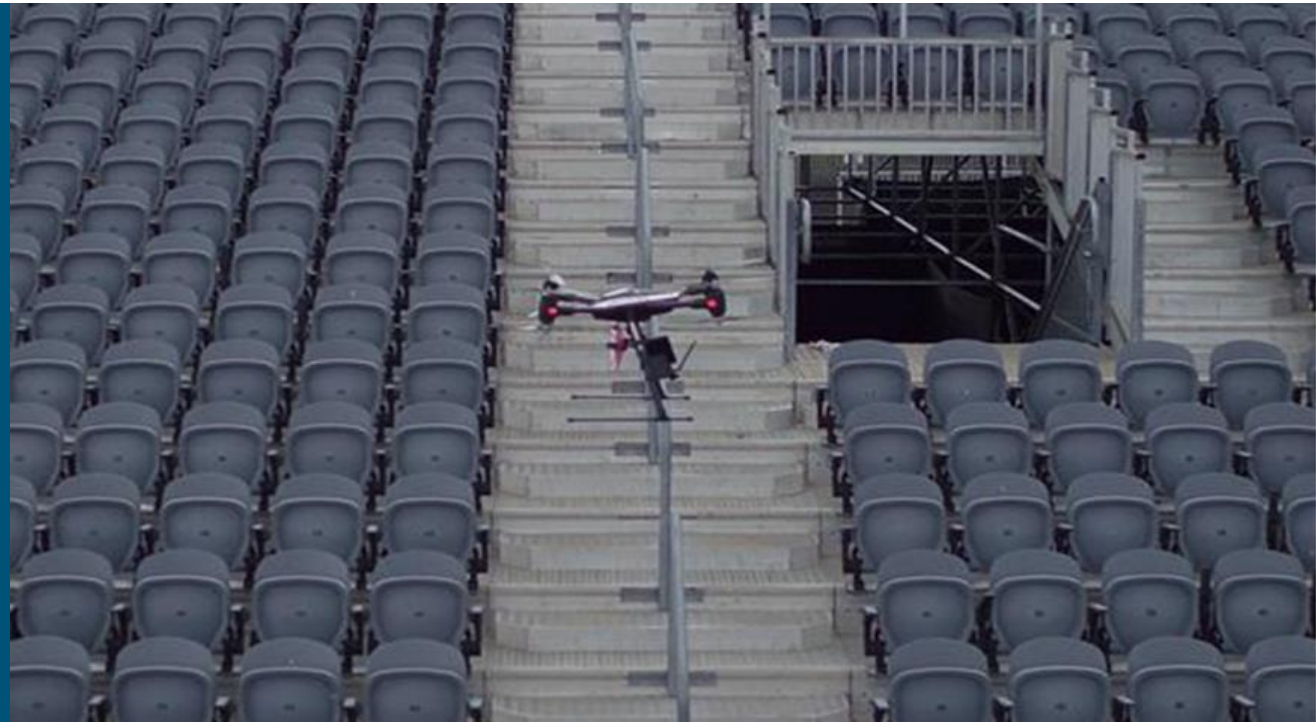
- Fulton, Texas
- 10 towers in 1 day
- Speed and efficiency
- Level of detail

Airborne LTE Operations (ALO)

- Emergency response
- Flying cell site
- Verizon’s 4G LTE to enhance recovery efforts
- Cape May UAS demonstration

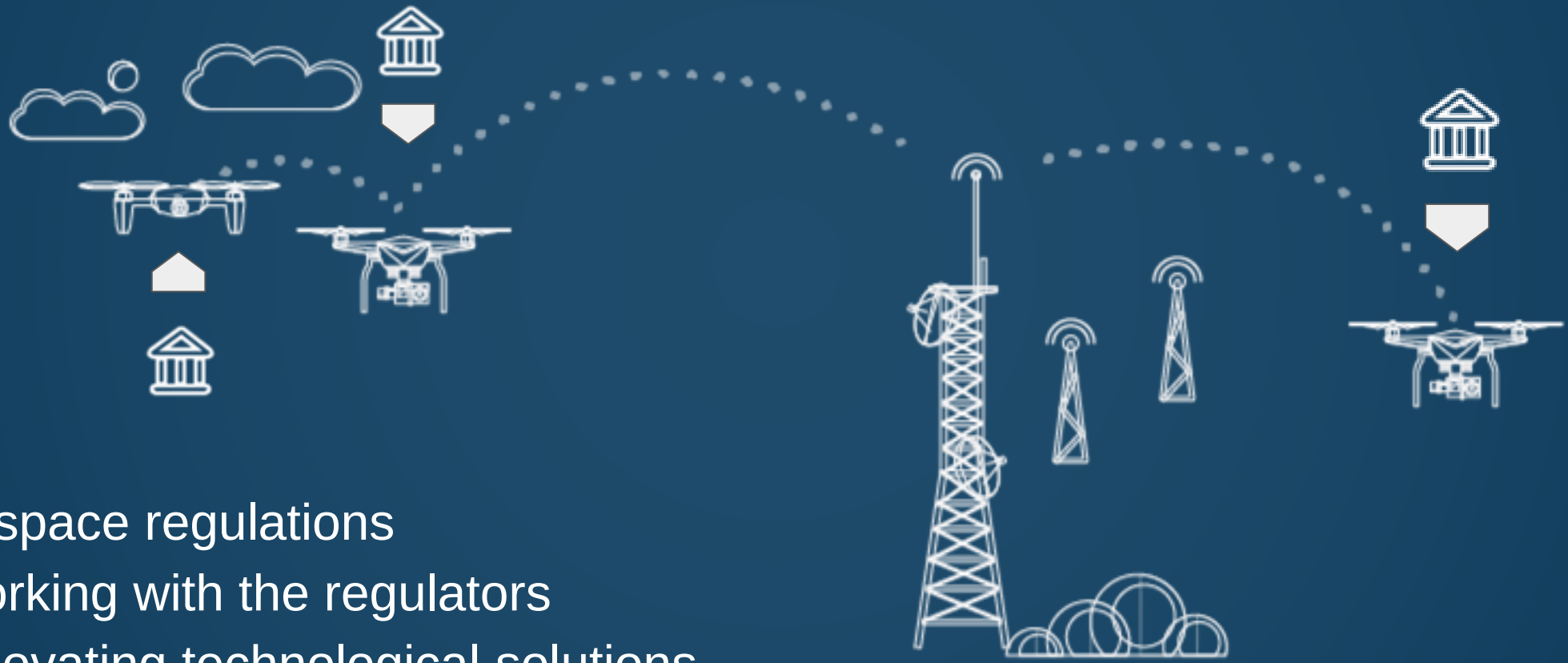
Venue Inspection

- Outside Austin, Texas
- Circuit of the Americas
- Traditionally, “walk-test”
- Service quality



Remote ID and Tracking

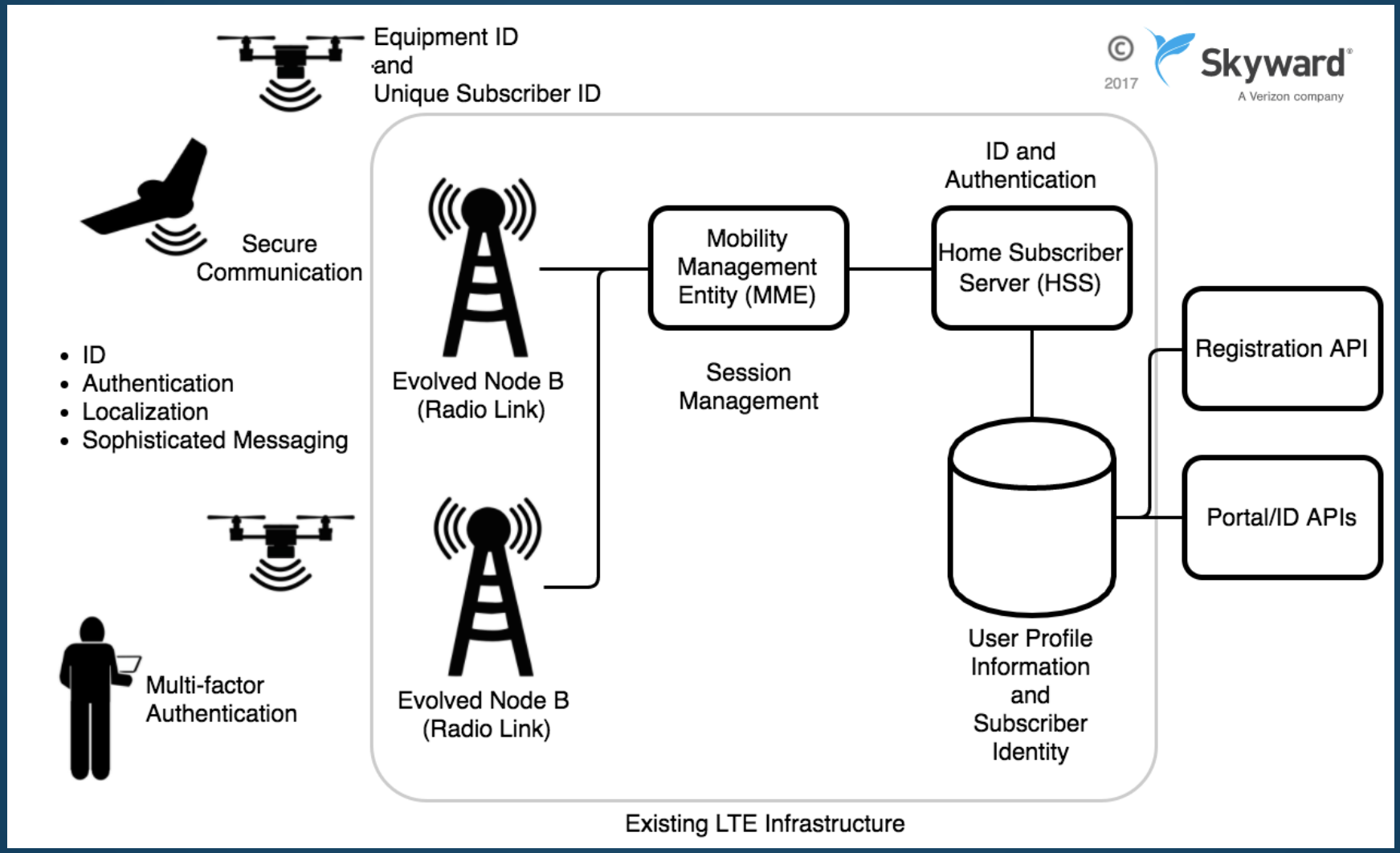
Harmonizing Means Integrating



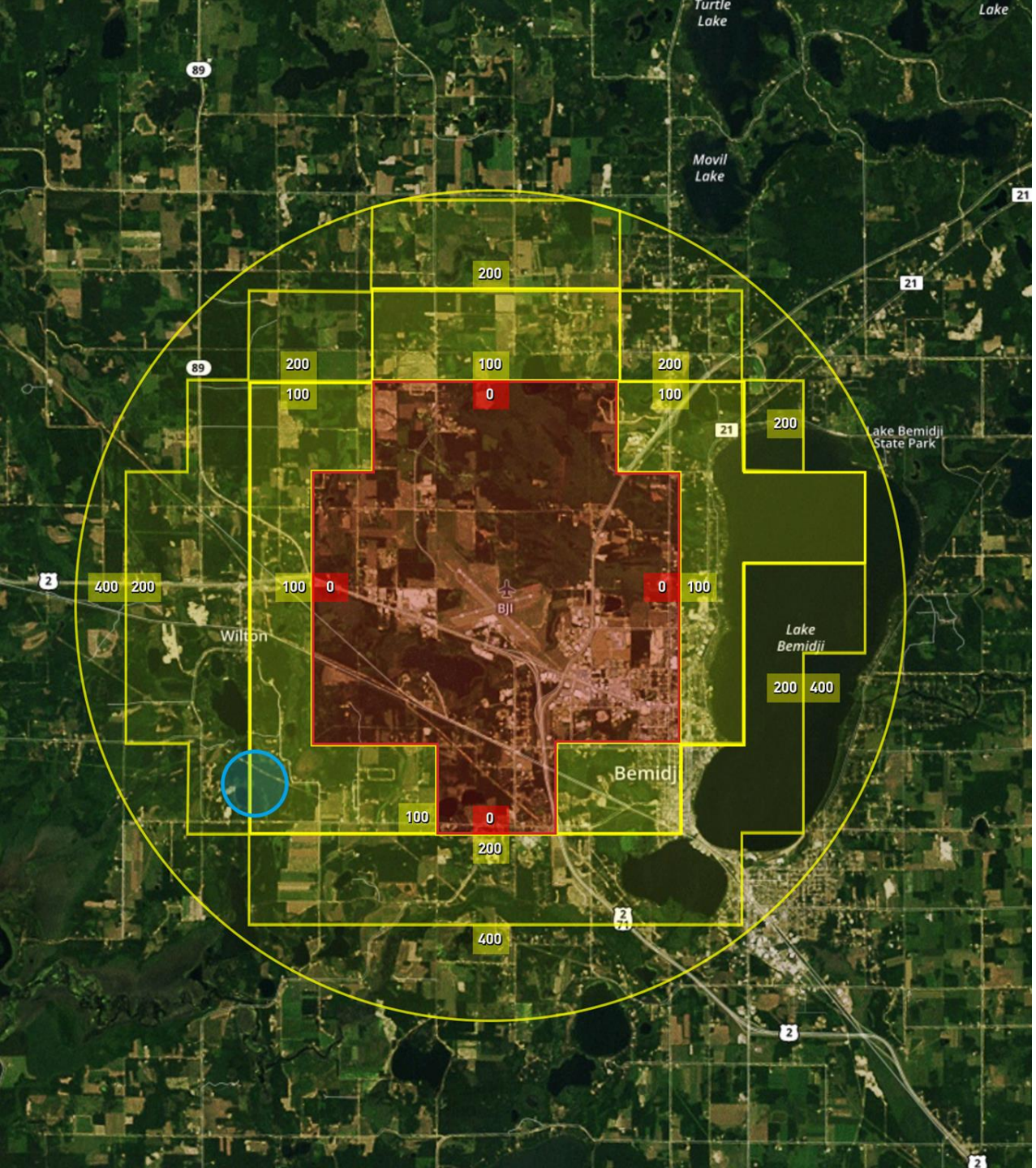
1. Airspace regulations
2. Working with the regulators
3. Innovating technological solutions

Skyward®
A Verizon company

A Proposed Framework

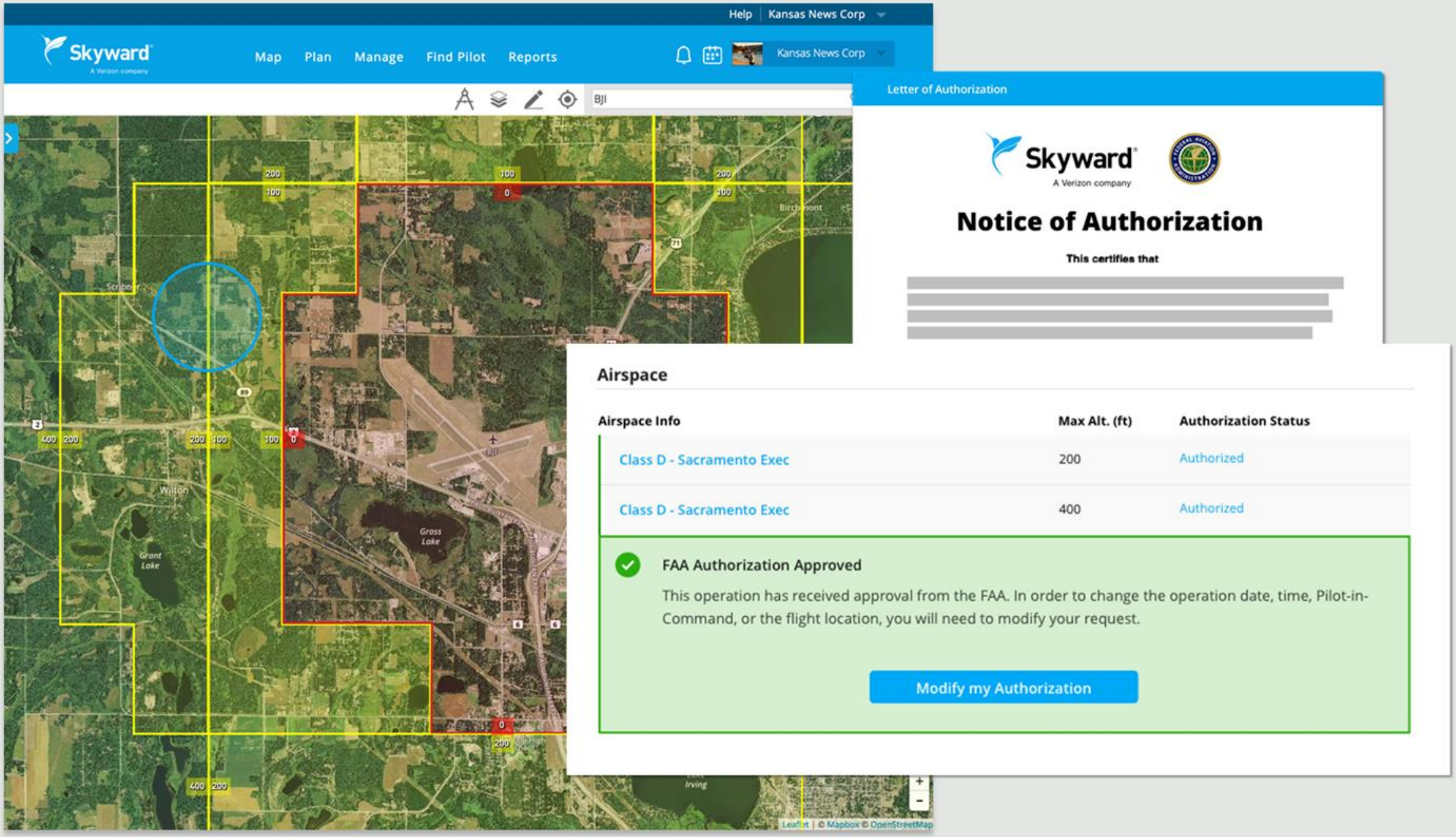


Access to Airspace



Automated Access to Controlled Airspace with Skyward

- FAA-approved vendor
- 60-90 days > seconds to receive authorization to fly
- FAA's beta program is active
- Full System expected to go online by February of 2018


Help
Kansas News Corp
Skyward
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Map
Plan
Manage
Find Pilot
Reports
Kansas News Corp
BJI
Letter of Authorization
Skyward
A Verizon company
Notice of Authorization
This certifies that
Airspace
Airspace Info
Max Alt. (ft)
Authorization Status
Class D - Sacramento Exec
200
Authorized
Class D - Sacramento Exec
400
Authorized
FAA Authorization Approved
This operation has received approval from the FAA. In order to change the operation date, time, Pilot-in-Command, or the flight location, you will need to modify your request.
Modify my Authorization
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Grant Lake
Grass Lake
Irving
Leaflet | © Mapbox © OpenStreetMap

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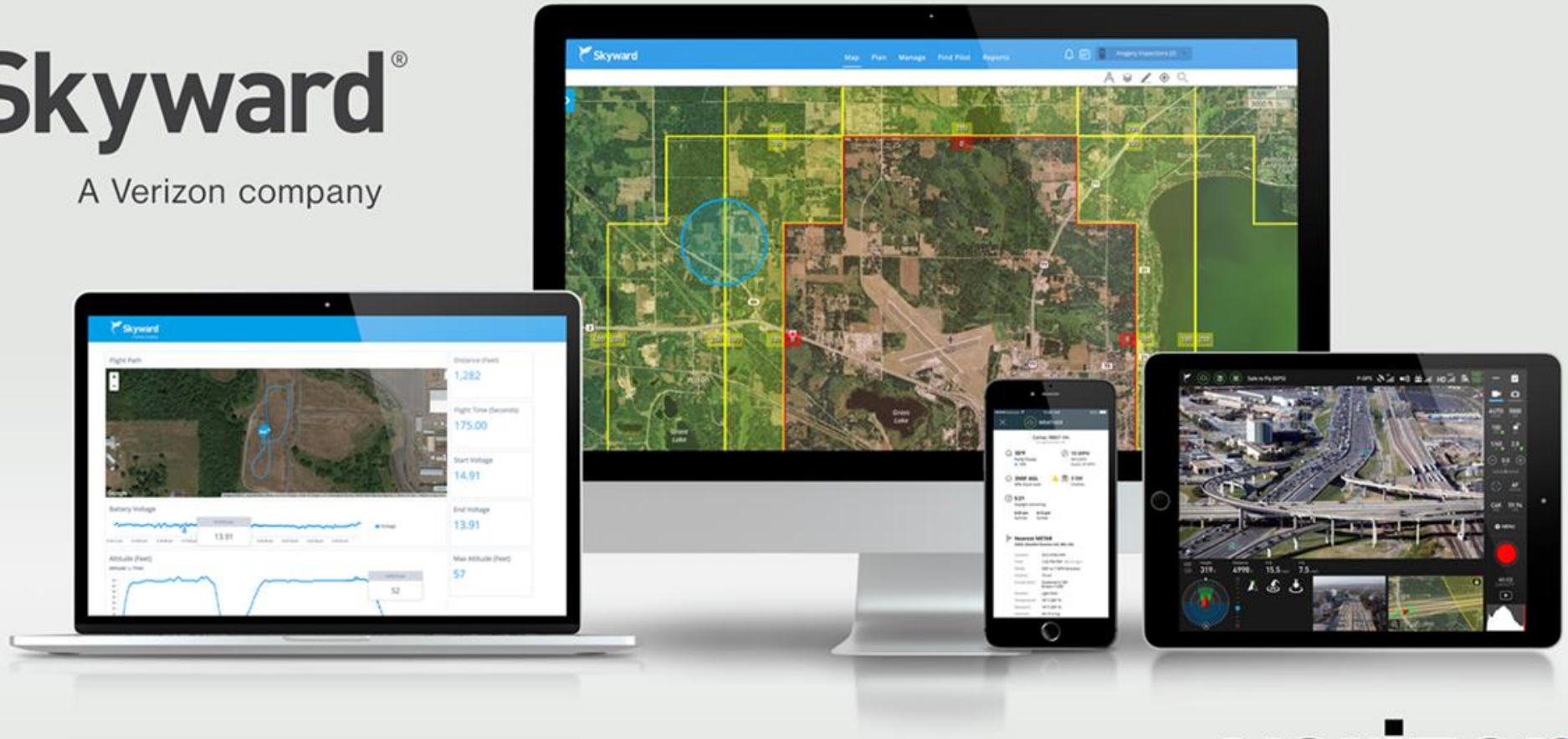

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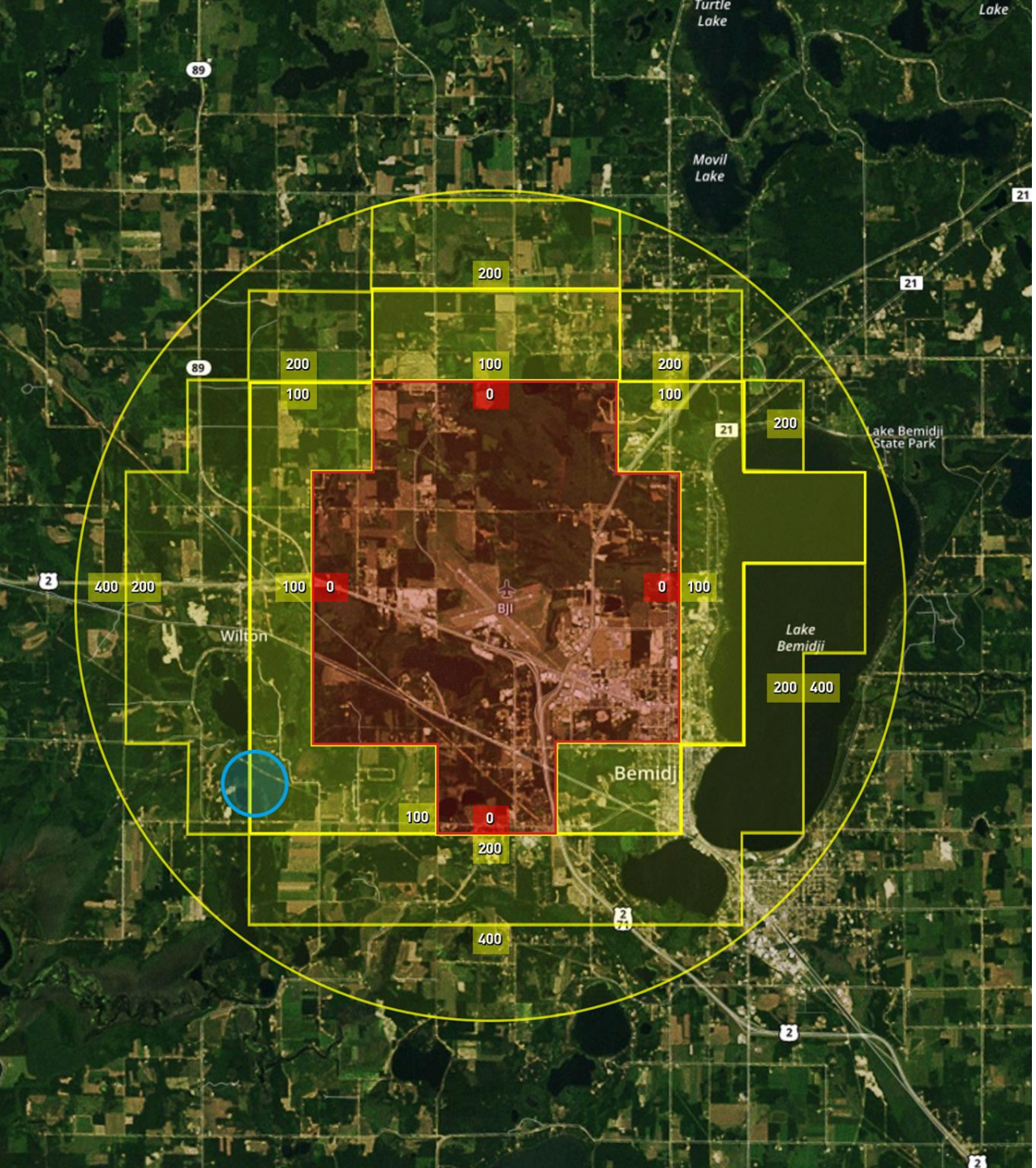
Accelerating the commercial drones market using cellular technology

Mark Jones

Global IoT Lead

Commercial Strategy & Market Development



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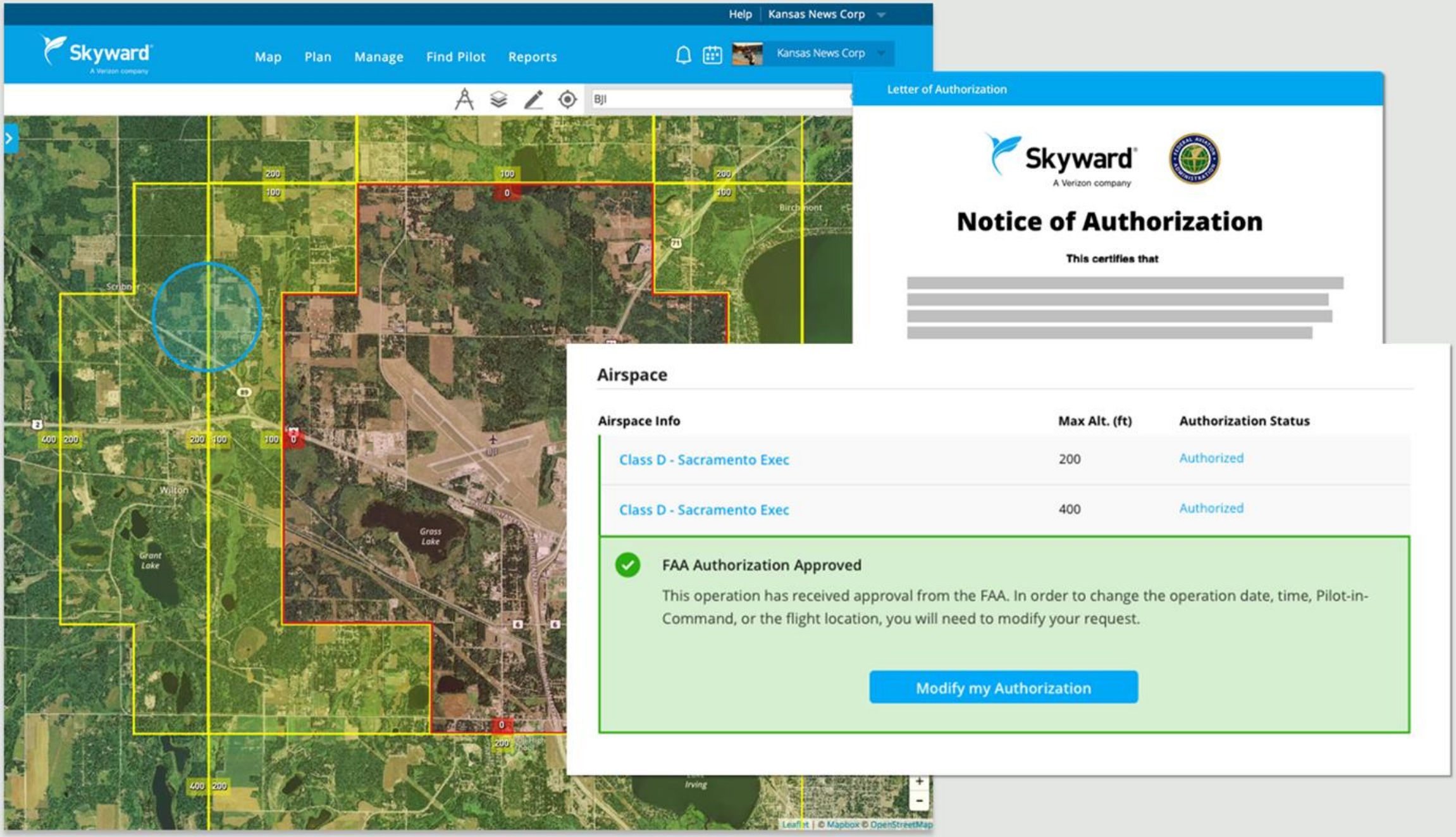
Help
Kansas News Corp
Skyward
A Verizon company
Map
Plan
Manage
Find Pilot
Reports
Kansas News Corp
BJI
Letter of Authorization
Skyward
A Verizon company
Notice of Authorization
This certifies that
Airspace
Airspace Info
Max Alt. (ft)
Authorization Status
Class D - Sacramento Exec
200
Authorized
Class D - Sacramento Exec
400
Authorized
FAA Authorization Approved
This operation has received approval from the FAA. In order to change the operation date, time, Pilot-in-Command, or the flight location, you will need to modify your request.
Modify my Authorization
Wilton
Grant Lake
Grass Lake
Irving
Leaflet | © Mapbox © OpenStreetMap

Skyward®

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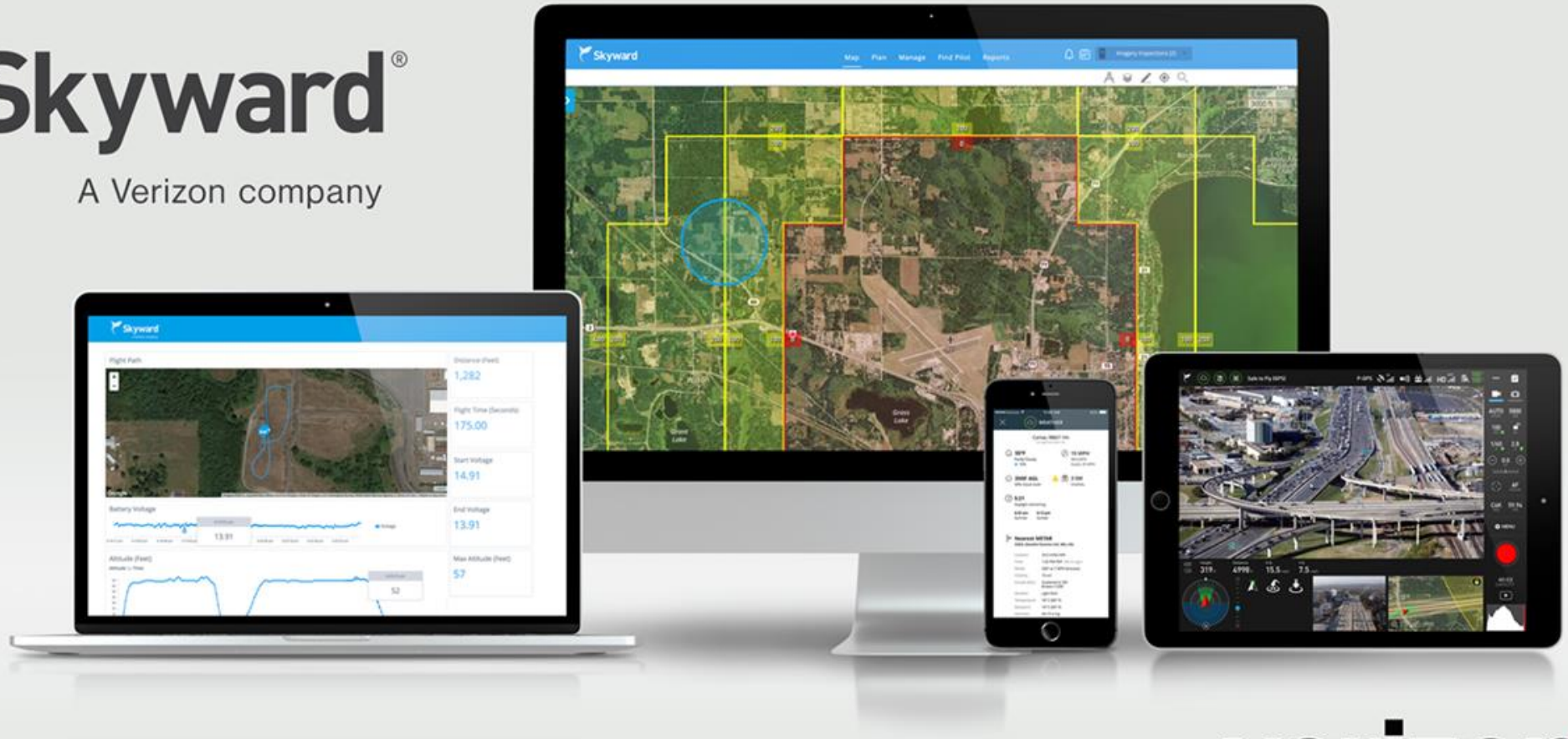

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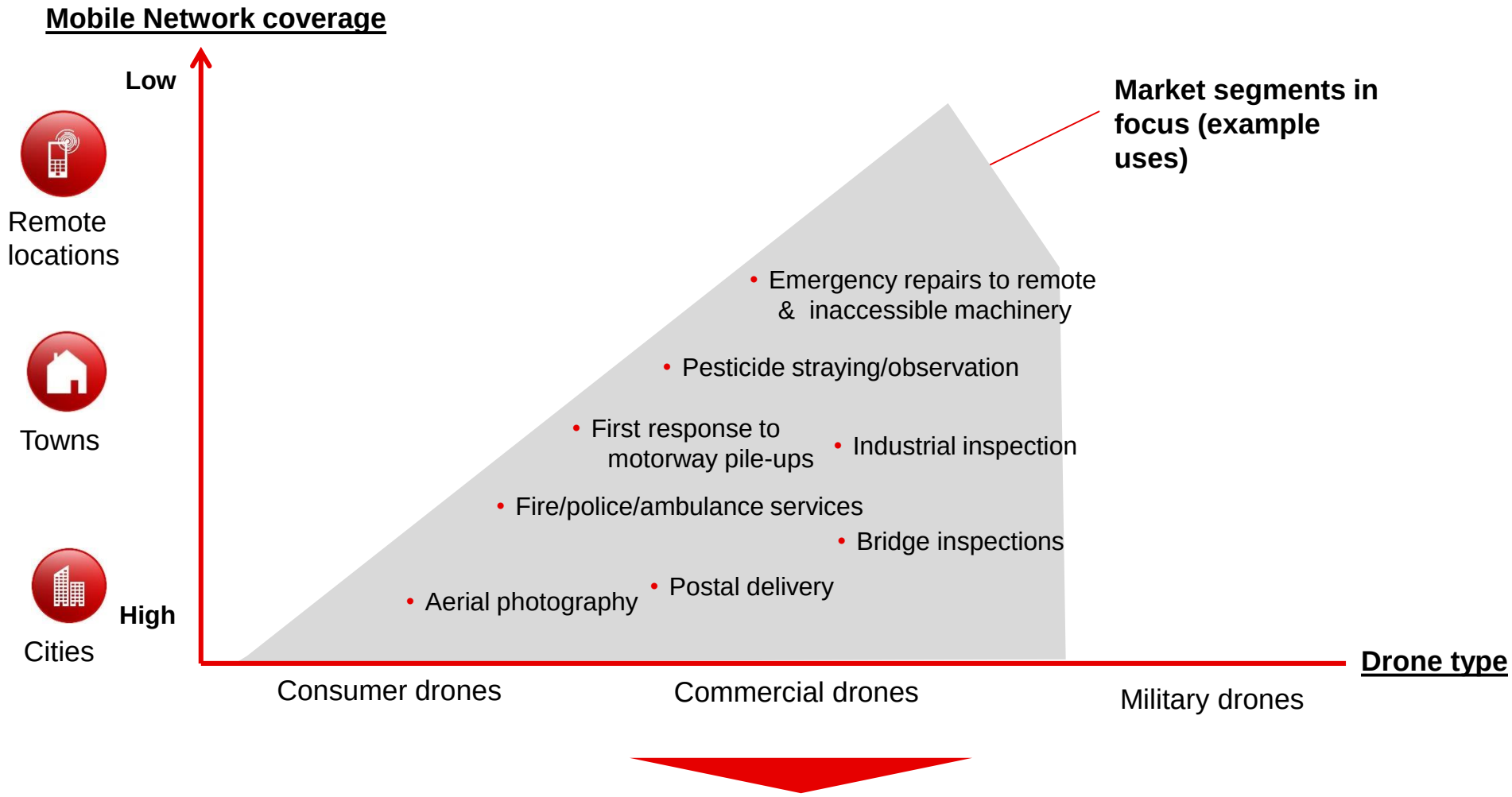
Commercial drones are the main target for cellular enablement



Application for Commercial drones, and where Mobile network coverage is best, i.e. in Cities and Towns

What form of communication will drones require and why ?

Air traffic control
(Low Altitude)

To be decided

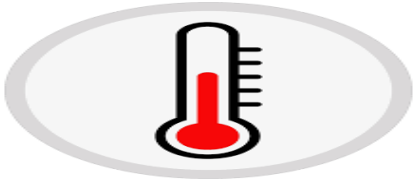
Potential for cellular

Information gathering (Video)

Flight enablement
(Authorisation)

Potential for cellular

Potential for cellular



Operational safety
(Temperature)

WVLOS:
Short range radio

BVLOS:
to be decided

Flight control

Cellular connectivity can underpin flight enablement , in flight safety and data / information gathering
Embedded SIMs commercial drones meets the needs of manufacturers, insurance and regulatory agencies

Cellular use cases can be segmented into three service categories

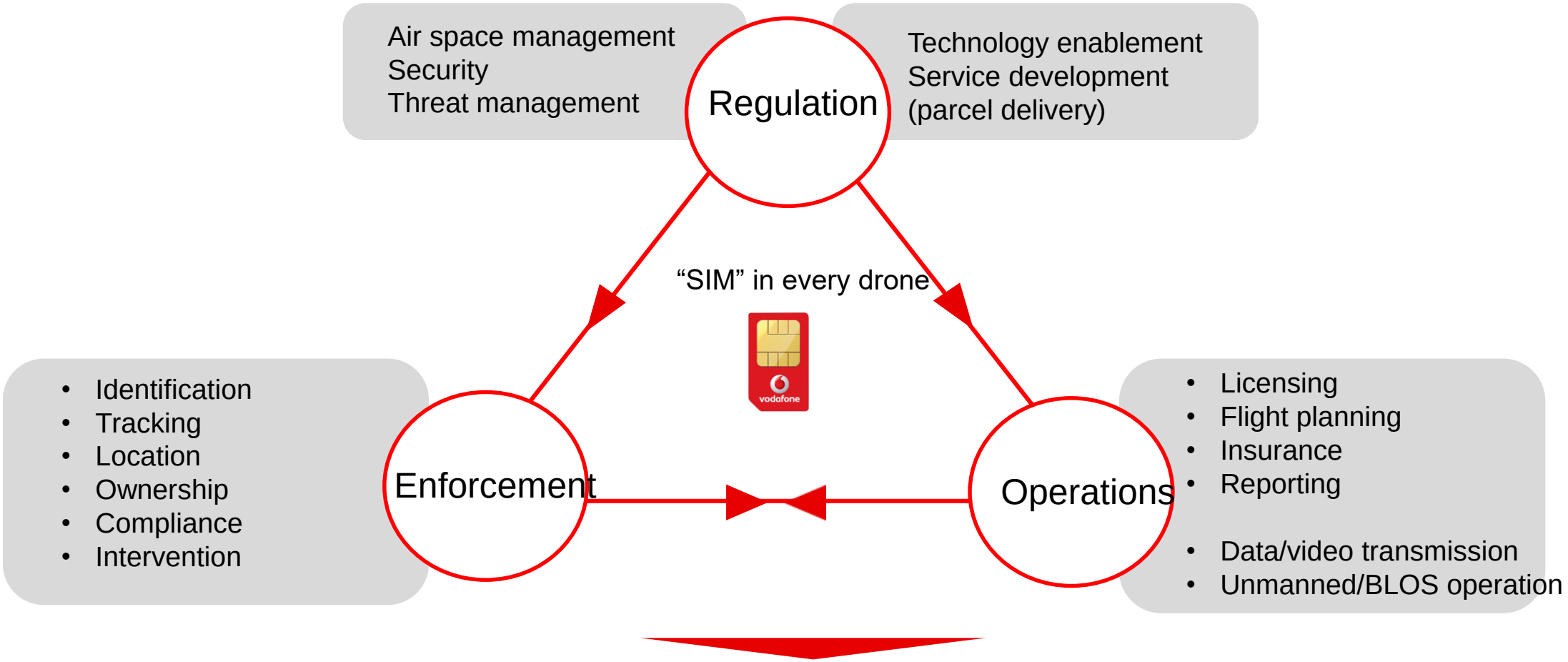
Authorisation Services	In-flight Services	Data / Info Services
➢ Drone Registration ➢ Pilot registration & ID ➢ Drone configuration ➢ Flight planning ➢ Flight configuration ➢ Flight authorisation ➢ Flight log ➢ Insurance	➢ Flight control ➢ Geo-locating ➢ Geo-fencing ➢ Flight deviation ➢ Remote intervention ➢ On ground services ➢ Over the air flight update ➢ Remote data / maintenance / fault ➢ Airtime monitoring ➢ Beaconing ➢ Collision avoidance	➢ Media streaming (video) ➢ Cargo monitoring ➢ Imagery analysis

We are using these use cases as the basis to engage with the external stakeholders in the Drones market

Vodafone “Radio Positioning System” for drones

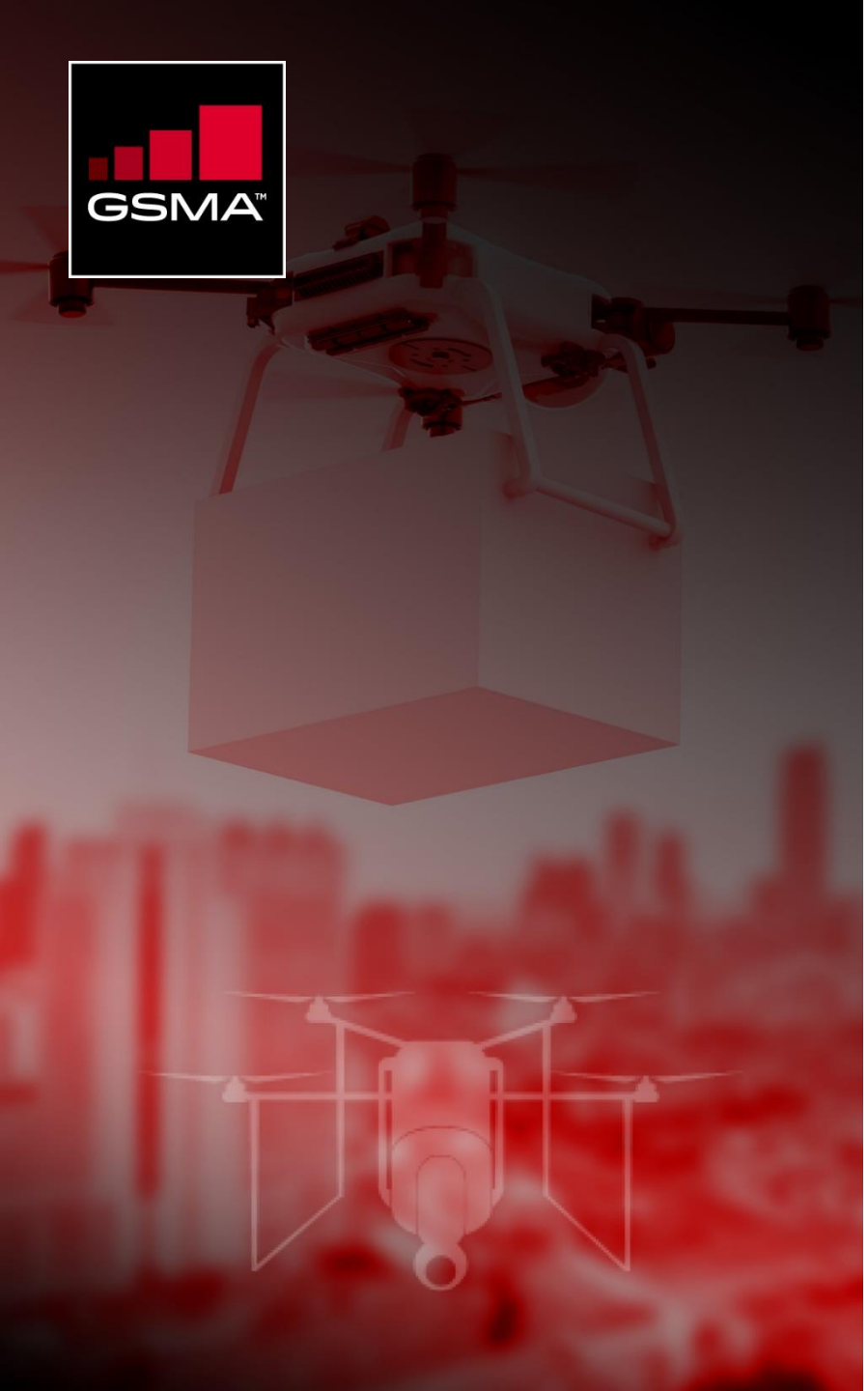
- Trial in Seville Spain – 20th October 2017 involving 32km low altitude flight of a x-uav drone
- Mobile network based system to monitor flights by drones - showing how commercial drones can be safely identified, geo-positioned and operated in future
- Demonstrated remote control & monitoring via purpose designed software based on UTM protocol
- Also provided real time HD video feed and telemetry information (wind speed, drone speed / altitude)

Collaboration is needed to accelerate market development



Governments want to encourage drone operations but are fearful of the risks – cellular technology enhances the features of the drone (video) but also supports and optimises the certification and enforcement process

Thank You



To find out more about the work on drones at the GSMA, and to subscribe to our IoT newsletter, visit:

www.gsma.com/drones